

# Stainless Steel Seamless Tubing

## Fractional Sizes

- Standard instrumentation tubing
- Chemically cleaned and passivated tubing
- Thermocouple-cleaned tubing

### Features

- Available in sizes from 1/8 to 2 in. outside diameter; metric sizes available upon request
- Marked to indicate size, material, specifications, and heat number

### Pressure Ratings

See Swagelok® *Tubing Data*, MS-01-107, for complete pressure ratings.

### Standard Instrumentation Tubing

#### Material Standards

Grade	UNS	ASTM	ASME
316 / 316L	S31600 / S31603	A213 <sup>①</sup> / A269	SA213 <sup>①</sup>
304 / 304L	S30400 / S30403	A213 <sup>①</sup> / A269	SA213 <sup>①</sup>

<sup>①</sup> Nominal wall thickness, not minimum wall thickness.

#### Chemical Composition

Element	Material Grade	
	316 / 316L	304 / 304L
	Composition, wt. %	
Chromium	16.0 to 18.0	18.0 to 20.0
Nickel	11.0 to 14.0	8.0 to 11.0
Molybdenum	2.00 to 3.00	—
Manganese	2.00 max	2.00 max
Silicon	0.75 max	0.75 max
Carbon	0.035 max <sup>①</sup>	0.035 max <sup>①</sup>
Sulfur	0.030 max	0.030 max

<sup>①</sup> Tubing sizes smaller than 1/2 in. outside diameter contain up to 0.040 wt. % carbon.



### Ordering Information and Dimensions

Select an ordering number.

Tube OD in.	Nominal Wall Thickness in.	Ordering Number	Nominal Length ft	Weight lb/ft
<b>316 / 316L Seamless</b>				
1/8	0.028	SS-T2-S-028-20	20	0.029
1/4	0.035	SS-T4-S-035-20		0.080
	0.049	SS-T4-S-049-20		0.105
	0.065	SS-T4-S-065-20		0.128
3/8	0.035	SS-T6-S-035-20		0.127
	0.049	SS-T6-S-049-20		0.171
	0.065	SS-T6-S-065-20		0.215
1/2	0.035	SS-T8-S-035-20		0.174
	0.049	SS-T8-S-049-20		0.236
	0.065	SS-T8-S-065-20		0.302
5/8	0.065	SS-T10-S-065-20		0.389
3/4	0.065	SS-T12-S-065-20		0.476
1	0.083	SS-T16-S-083-20		0.813
1 1/4	0.095	SS-T20-S-095-20		1.187
	0.120	SS-T20-S-120-20		1.473
1 1/2	0.120	SS-T24-S-120-20		1.792
	0.134	SS-T24-S-134-20	1.981	
2	0.134	SS-T32-S-134-20	2.705	
	0.188	SS-T32-S-188-20	3.686	
<b>304 / 304L Seamless</b>				
1/4	0.035	304L-T4-S-035-20	20	0.080
3/8	0.035	304L-T6-S-035-20		0.127
1/2	0.035	304L-T8-S-035-20		0.174

# Chemically Cleaned and Passivated and Thermocouple-Cleaned Tubing

## Material Standards

Grade	UNS	ASTM	ASME
316L	S31603	A269 <sup>①</sup>	SA213 <sup>①</sup>

<sup>①</sup> Nominal wall thickness, not minimum wall thickness.

## Chemical Composition

Element	Composition, wt. %
Chromium	16.0 to 18.0
Nickel	10.0 to 15.0
Molybdenum	2.00 to 3.00
Manganese	2.00 max
Silicon	0.75 max
Carbon	0.035 max <sup>①</sup>
Sulfur (chemically cleaned and passivated)	0.005 to 0.012 (seamless) 0.005 to 0.017 (welded)
Sulfur (thermocouple-cleaned)	0.030 max

<sup>①</sup> Tubing sizes smaller than 1/2 in. outside diameter contain up to 0.040 wt. % carbon.

## Tubing Tools and Accessories

See the Swagelok *Tubing Tools and Accessories* catalog, MS-01-179, for more information.



## Tube Fittings

See the Swagelok *Gaugeable Tube Fittings and Adapter Fittings* catalog, MS-01-140, for information.



## Swagelok Orbital Welding System

See the Swagelok *Orbital Welding System Quick Reference Guide*, MS-02-143, for more information.



### Safe Product Selection

**When selecting a product, the total system design must be considered to ensure safe, trouble-free performance. Function, material compatibility, adequate ratings, proper installation, operation, and maintenance are the responsibilities of the system designer and user.**

## Cleaning and Packaging

### Chemically Cleaned and Passivated Tubing

This tubing complies with ASTM G93, Level A requirement for nonvolatile residue levels and also meets requirements of CGA G4.1. Tubing ends are protected with polyamide nylon film and polyethylene caps. Tubing is packed in single polyethylene, heat-sealed bags.

### Thermocouple-Cleaned Tubing

This tubing meets the cleanliness requirements of ASTM A632-S3. Tubing ends are protected with polyethylene caps. Tubing is bulk packaged in polyethylene, heat-sealed bags.

Product	Inside Diameter Finish	Process Designator	External Finish
Chemically cleaned and passivated	20 $\mu$ in. $R_a$ max	G20	Satin
	32 $\mu$ in. $R_a$ max	G30	
Thermocouple-cleaned	Standard finish (see ASTM A269)	G	

## Ordering Information and Dimensions

To order, add a process designator from the table above to a basic ordering number.

Tube OD in.	Nominal Wall Thickness in.	Basic Ordering Number	Nominal Length ft	Weight lb/ft
<b>316L Seamless</b>				
1/8	0.020	6L-T2-S-020-20-	20	0.022
	0.028	6L-T2-S-028-20-G <sup>①</sup>		0.029
1/4	0.035	6L-T4-S-035-20-		0.080
	0.049	6L-T4-S-049-20-		0.105
3/8	0.035	6L-T6-S-035-20-		0.127
	0.049	6L-T6-S-049-20-		0.171
1/2	0.035	6L-T8-S-035-20-		0.174
	0.049	6L-T8-S-049-20-		0.236
	0.065	6L-T8-S-065-20-		0.302
5/8	0.065	6L-T10-S-065-20-		0.389
3/4	0.065	6L-T12-S-065-20-		0.476
1	0.065	6L-T16-S-065-20-G20 <sup>①</sup>		0.649
	0.083	6L-T16-S-083-20-	0.813	

<sup>①</sup> For thermocouple-cleaned tubing only. To order, use ordering number shown.

<sup>②</sup> For 20  $\mu$ in. tubing only. To order, use ordering number shown.

## Warranty Information

Swagelok products are backed by The Swagelok Limited Lifetime Warranty. For a copy, visit [swagelok.com](http://swagelok.com) or contact your authorized Swagelok representative.